Agency for Healthcare Research and Quality
Advancing Excellence in Health Care

NATIONAL GUIDELINE CLEARINGHOUSE

# General

## Guideline Title

Cervical and thoracic spine disorders.

## Bibliographic Source(s)

Cervical and thoracic spine disorders. In: Hegmann KT, editor(s). Occupational medicine practice guidelines. Evaluation and management of common health problems and functional recovery in workers. 3rd ed. Elk Grove Village (IL): American College of Occupational and Environmental Medicine (ACOEM); 2011. p. 1-332.

## Guideline Status

This is the current release of the guideline.

# Regulatory Alert

## FDA Warning/Regulatory Alert

Note from the National Guideline Clearinghouse: This guideline references a drug(s) for which important revised regulatory and/or warning information has been released.

- March 22, 2016 – Opioid pain medicines : The U.S. Food and Drug Administration (FDA) is warning about several safety issues with the entire class of opioid pain medicines. These safety risks are potentially harmful interactions with numerous other medications, problems with the adrenal glands, and decreased sex hormone levels. They are requiring changes to the labels of all opioid drugs to warn about these risks.

# Recommendations

## Major Recommendations

Definitions for the strength of evidence ratings (A, B, C and I) and the criteria for evidenced-based recommendations are presented at the end of the "Major Recommendations" field.

Summary Tables: Recommendations and Evidence

Table 1 is a summary of the recommendations from the Evidence-based Practice Cervical and Thoracic Spine Panel for diagnostic testing for

cervical and thoracic spine disorders. Table 2 is a summary of recommendations for managing these disorders. The recommendations are based on critically appraised higher quality research evidence and on expert consensus observing First Principles when higher quality evidence was unavailable or inconsistent. The reader is cautioned to utilize the more detailed indications, specific appropriate diagnoses, temporal sequencing, prior testing or treatment, and contraindications that are elaborated in more detail for each test or treatment in the body of this Guideline in using these recommendations in clinical practice or medical management. These recommendations are not simple "yes/no" criteria, and the evidence supporting them was in nearly all circumstances developed from typical patients, and not unusual situations or exceptions. Note that the phrase "there are no quality trials" is contained throughout this document and refers to a lack of high- or moderate-quality trials for that particular intervention or test. Recommendations for those topics are consensus of the panel.

Recommendations are made under the following categories:

- Strongly Recommended, "A" Level
- Moderately Recommended, "B" Level
- Recommended, "C" Level
- Insufficient – Recommended (Consensus-based), "I" Level
- Insufficient – No Recommendation (Consensus-based), "I" Level
- Insufficient – Not Recommended (Consensus-based), "I" Level
- Not Recommended, "C" Level
- Moderately Not Recommended, "B" Level
- Strongly Not Recommended, "A" Level

Table 1. Summary of Recommendations for Diagnostic and Other Testing for Cervical and Thoracic Spine Disorders

| Test | Recommendation(s) |
|---|---|
| X-ray | X-ray for acute cervicothoracic pain with red flags for fracture or serious systemic illness, subacute cervicothoracic pain that is not improving, or chronic cervicothoracic pain – Recommended, Insufficient Evidence (I)<br><br>Flexion and extension views for evaluating symptomatic spondylolisthesis in which there is consideration for surgery or other invasive treatment or occasionally in the setting of trauma – Recommended, Insufficient Evidence (I)<br><br>Routine x-ray for acute, non-specific cervicothoracic pain – Not Recommended, Insufficient Evidence (I) |
| MRI | Magnetic resonance imaging (MRI) is recommended [Recommended, Evidence (C)] for patients with:<br><br>• Acute cervical pain with progressive neurologic deficit<br>• Significant trauma with no improvement in significantly painful or debilitating symptoms<br>• A history of neoplasia (cancer)<br>• Multiple neurological abnormalities that span more than one neurological root level<br>• Previous neck surgery with increasing neurologic symptoms<br>• Fever with severe cervical pain<br>• Symptoms or signs of myelopathy<br>• Subacute or chronic radicular pain syndromes lasting at least 4 to 6 weeks in whom dermatomal and myotomal symptoms are not trending towards improvement if either injection is being considered or both the patient and surgeon are considering early surgical treatment if supportive findings on MRI are found<br><br>Repeat MRI in the absence of significant new radicular or myelopathy symptoms and/or signs – Not Recommended, Evidence (I). An exception would be agreement on the part of the patient and surgeon that surgery will be performed, and the previous MRI is over 6 months old.<br><br>MRI for the evaluation of patients with non-specific chronic cervicothoracic pain – Not Recommended, Evidence (I). MRI may be considered if purpose is to rule out non-injury related diagnoses in select patients, such as possible neoplasia, infection, or other neurological illnesses, based on the presence of symptoms or findings that suggest these diagnoses.<br><br>MRI for acute whiplash patients without evidence of dermatomal and myotomal symptoms and signs – Not Recommended, Evidence (C)<br><br>MRI for acute radicular pain syndromes – Not Recommended, Insufficient Evidence (I). Exceptions include progressive |

| Test | Recommendation(s) |
|---|---|
| | neurological deficit or severe impairment not trending towards improvement and either injection is being considered or both the patient and the surgeon are willing to consider early surgical treatment if supportive findings on MRI are found.<br><br>Flexion/extension, standing, or weight-bearing MRI for cervicothoracic pain or radicular pain syndrome – Not Recommended, Insufficient Evidence (I)<br><br>Open MRI – Not Recommended, Insufficient Evidence (I). Exceptions include circumstances where the patient is either morbidly obese and exceeds the closed MRI unit's weight specifications, or suffers from claustrophobia that is not alleviated with a low-dose anxiolytic administered prior to the procedure. |
| Discography | Discography, whether performed as a solitary test or when paired with imaging (e.g., MRI, computed tomography [CT]) for acute, subacute, or chronic cervicothoracic pain or radicular pain syndromes – Not Recommended, Insufficient Evidence (I) |
| MRI Discography | MRI discography for evaluating herniated discs – Not Recommended, Insufficient Evidence (I) |

Table 2: Summary of Recommendations for Managing Cervicothoracic Disorders

| Cervicothoracic Disorder | Treatment with Evidence Rating/Recommendation Level | | |
|---|---|---|---|
| | Recommended | No Recommendation | Not Recommended |
| Acute Cervicothoracic Pain | Sleep posture which is most comfortable for the patient is recommended. If a patient habitually chooses a particular sleep posture, it may be reasonable to recommend altering posture to determine if there is a reduction in pain or other symptoms. (I)<br><br>Aerobic exercise (I)<br><br>Specific stretching exercises for acute non-specific cervicothoracic pain (I)<br><br>Strengthening, endurance, and aerobic exercises (B)<br><br>Inclusion of fear avoidance belief training during the course of rehabilitation (I)<br><br>Non-steroidal anti-inflammatory drugs (NSAIDs) (I)<br><br>Proton pump inhibitors or misoprostol for patients at substantially increased risk for gastrointestinal bleeding (A)<br><br>Sucralfate for patients at substantially increased risk for gastrointestinal bleeding (B)<br><br>H2 blockers for patients at substantially increased risk for gastrointestinal bleeding (C)<br><br>Patients with known cardiovascular disease or multiple risk factors for cardiovascular | Educational programs and education for prevention of cervicothoracic pain (I)<br><br>Use of specific commercial products (e.g., neck pillows) (I)<br><br>Stretching exercises as an isolated prescription or program for preventing cervicothoracic pain (I)<br><br>Aquatic therapy (I)<br><br>Yoga (I)<br><br>Creams and ointments (I)<br><br>Thiocolchicoside (I)<br><br>Willow bark (Salix), ginger extract, rose hips, camphora molmol, maleluca alternifolia, angelica sinensis, aloe vera, thymus officinalis, menthe peperita, arnica montana, curcuma longa, tancaetum parthenium, and zingiber officinicalis, avocado soybean unsaponifiables, oral enzymes, topical copper salicylate, S-Adenosylmethionine, and diacerin harpagoside (I)<br><br>Magnets (I)<br><br>Infrared therapy (I)<br><br>Ultrasound is desirable for treatment of acute cervicothoracic pain, but only as an adjunct with exercise. (I)<br><br>Low-level laser therapy (I) | Educational programs as a sole treatment (I)<br><br>Rest and immobilization (B)<br><br>Absent other indicators of a need for treatment with tricyclic anti-depressants (TCAs) and serotonin norepinephrine reuptake inhibitors (SNRIs), anti-depressants are not recommended. (I)<br><br>Oral and intravenous (IV) colchicines (I)<br><br>Glucocorticosteroids (I)<br><br>Muscle relaxants for mild to moderate acute cervicothoracic pain (I)<br><br>Routine use of opioids for acute non-malignant pain conditions (C)<br><br>Vitamins (I)<br><br>Routine use of acupuncture (I) |

| Cervicothoracic Disorder | Treatment with Evidence Rating/Recommendation Level | | |
|---|---|---|---|
| | Recommended | No Recommendation | Not Recommended |
| | disease should have the risks and benefits of NSAID therapy for pain discussed. (I)<br><br>Acetaminophen or aspirin as the first-line therapy appear to be the safest to use for these patients. (A)<br><br>Acetaminophen for cervicothoracic pain with or without radicular symptoms, particularly for those with contraindications for NSAIDs (I)<br><br>Capsaicin (capsicum) (I)<br><br>Muscle relaxants as a second-line treatment in moderate to severe acute cervicothoracic pain that has not been adequately controlled by NSAIDs (C)<br><br>Judicious use of opioids for acute severe cervicothoracic pain (C)<br><br>Self-application of low-tech cryotherapies (I)<br><br>Heat therapy, including a heat wrap (C)<br><br>Manipulation/mobilization for short-term relief of cervical pain or as a component of an active treatment program focusing on active exercises (B)<br><br>Massage for acute cervicothoracic pain in which pain is a substantial symptom component (I)<br><br>Fear avoidance belief training, particularly if there are any suggestions of fear avoidance belief issues (I) | | Routine use of cryotherapies in health care provider offices or home use of a high-tech device (I)<br><br>Diathermy (C)<br><br>Regular or routine manipulation or mobilization, prolonged treatment (manipulation several times a month for years), and prophylactic treatment (I)<br><br>Manipulation under anesthesia (MUA) and medication-assisted spinal manipulation (MASM) (I)<br><br>Mechanical devices for administering massage (I)<br><br>Myofascial release (I)<br><br>Neuroreflexotherapy for acute cervicothoracic pain with or without radicular pain (I)<br><br>Subcutaneous carbon-dioxide insufflation (B)<br><br>Traction (C)<br><br>Interferential therapy for acute cervicothoracic pain with or without radiculopathy (I)<br><br>Iontophoresis (I)<br><br>Microcurrent electrical stimulation (I)<br><br>Transcutaneous electrical nerve stimulation (TENS) (I)<br><br>Botulinum injections for non-specific acute cervical pain (C) |

| Cervicothoracic Disorder | Treatment with Evidence Rating/Recommendation Level | | |
|---|---|---|---|
| | Recommended | No Recommendation | Not Recommended |
| | | | Continuous infusion of corticosteroids and local anesthetic for acute cervicothoracic pain with or without radiculopathy (I)<br><br>Epidural glucocorticosteroid injections for acute cervical pain in the absence of significant radicular symptoms (I)<br><br>Facet joint injections with hyaluronic acid for acute cervicothoracic pain with or without radicular pain syndromes (I)<br><br>Intradiscal electrothermal therapy for acute cervicothoracic pain with or without radicular pain syndromes (I)<br><br>Percutaneous intradiscal radiofrequency thermocoagulation for acute cervicothoracic pain with or without radicular pain syndromes (I)<br><br>Prolotherapy injections for acute cervicothoracic pain with or without radicular pain syndromes (I)<br><br>Percutaneous discectomy (nucleoplasty), laser discectomy, and disc coblation therapy (I)<br><br>Discectomy for acute cervical or thoracic pain without radiculopathy (I)<br><br>Work |

| Cervicothoracic Disorder | Treatment with Evidence Rating/Recommendation Level | | |
|---|---|---|---|
| | Recommended | No Recommendation | Not Recommended |
| | | | conditioning/work hardening programs for acute cervicothoracic pain with or without radicular pain syndromes (I)<br><br>Cognitive behavioral therapy for acute cervicothoracic pain with or without radicular pain syndromes (I) |
| Subacute Cervicothoracic Pain | Educational programs for select patients (I)<br><br>Sleep posture which is most comfortable for the patient is recommended. If a patient habitually chooses a particular sleep posture, it may be reasonable to recommend altering posture to determine if there is a reduction in pain or other symptoms. (I)<br><br>Aerobic exercise (I)<br><br>Specific stretching exercises for subacute non-specific cervicothoracic pain (I)<br><br>Strengthening, endurance, and aerobic exercises (B)<br><br>Inclusion of fear avoidance belief training during the course of rehabilitation (I)<br><br>NSAIDs (I)<br><br>Proton pump inhibitors or misoprostol for patients at substantially increased risk for gastrointestinal bleeding (A)<br><br>Sucralfate for patients at substantially increased risk for gastrointestinal bleeding (B)<br><br>H2 blockers for patients at substantially increased risk for gastrointestinal bleeding (C)<br><br>Patients with known cardiovascular disease or multiple risk factors for cardiovascular disease should have the risks and benefits of NSAID therapy for pain discussed. (I) Acetaminophen or aspirin as the first-line therapy appear to be the safest to use for these patients. (A)<br><br>Acetaminophen for cervicothoracic pain with or without radicular symptoms, | Educational programs and education for prevention of cervicothoracic pain (I)<br><br>Use of specific commercial products (e.g., neck pillows) (I)<br><br>Stretching exercises as an isolated prescription or program for preventing cervicothoracic pain (I)<br><br>Aquatic therapy (I)<br><br>Yoga (I)<br><br>Creams and ointments (I)<br><br>Thiocolchicoside (I)<br><br>Willow bark (Salix), ginger extract, rose hips, camphora molmol, maleluca alternifolia, angelica sinensis, aloe vera, thymus officinalis, menthe peperita, arnica montana, curcuma longa, tancaetum parthenium, and zingiber officinicalis, avocado soybean unsaponifiables, oral enzymes, topical copper salicylate, S-Adenosylmethionine, and diacerin harpagoside (I)<br><br>Magnets (I)<br><br>Infrared therapy (I)<br><br>Ultrasound (I)<br><br>Low-level laser therapy (I) | Rest (I)<br><br>Absent other indicators of a need for treatment with TCAs and SNRIs, anti-depressants are not recommended. (I)<br><br>Oral and intravenous colchicines (I)<br><br>Glucocorticosteroids (I)<br><br>Muscle relaxants (I)<br><br>Routine use of opioids for subacute non-malignant pain conditions (C)<br><br>Vitamins (I)<br><br>Routine use of acupuncture (I)<br><br>Routine use of cryotherapies in health care provider offices or home use of a high-tech device (I)<br><br>Diathermy (C)<br><br>Regular or routine manipulation or mobilization, prolonged treatment manipulation several times a month for years), and prophylactic treatment (I)<br><br>MUA and MASM (I) |

| Cervicothoracic Disorder | Treatment with Evidence Rating/Recommendation Level | | |
|---|---|---|---|
| | Recommended | No Recommendation | Not Recommended |
| | particularly for those with contraindications for NSAIDs (I)<br><br>Capsaicin (capsicum) (I)<br><br>Opioids for select patients (I)<br><br>Heat therapy, including a heat wrap (C)<br><br>Manipulation/mobilization of the cervical and/or thoracic spine for short-term relief of cervical pain (B)<br><br>Massage for subacute cervicothoracic pain in which pain is a substantial symptom component (I)<br><br>Chronic pain management/functional restoration programs can be used with caution in late subacute phase if their cost can be justified based on early development of major psychosocial barriers to recovery, opioid dependence, severe post-operative complications, severe mood disorders, or complicating co-morbid conditions (I)<br><br>Work conditioning/work hardening for subacute cervicothoracic pain with or without radicular pain syndromes (I)<br><br>Participatory ergonomic programs, where available, for highly select patients with subacute cervicothoracic pain who remain off work or on a different job and where there is managerial support and interest (I)<br><br>Cognitive behavioral therapy as a component of a formal interdisciplinary program (I)<br><br>Fear avoidance belief training, particularly if there are any suggestions of fear avoidance belief issues (I)<br><br>A multidisciplinary rehabilitation program with a participatory ergonomics team for patients with subacute cervicothoracic pain with lost-time injuries (I) | | Mechanical devices for administering massage (I)<br><br>Myofascial release (I)<br><br>Neuroreflexotherapy for subacute cervicothoracic pain with or without radicular pain (I)<br><br>Subcutaneous carbon-dioxide insufflation (B)<br><br>Traction (C)<br><br>Interferential therapy for subacute pain with or without radicular pain (I)<br><br>Iontophoresis (I)<br><br>Microcurrent electrical stimulation (I)<br><br>TENS (I)<br><br>Botulinum injections for non-specific subacute acute cervical pain (C)<br><br>Continuous infusion of corticosteroids and local anesthetic for subacute cervicothoracic pain with or without radiculopathy (I)<br><br>Epidural glucocorticosteroid injections for subacute cervical pain in the absence of significant radicular symptoms (I)<br><br>Facet joint injections with hyaluronic acid for subacute cervicothoracic pain with or without radicular pain syndromes (I)<br><br>Intradiscal electrothermal therapy for subacute |

| Cervicothoracic Disorder | Treatment with Evidence Rating/Recommendation Level | | |
|---|---|---|---|
| | Recommended | No Recommendation | Not Recommended |
| | | | cervicothoracic pain with or without radicular pain syndromes (I)<br><br>Percutaneous intradiscal radiofrequency thermocoagulation for subacute cervicothoracic pain with or without radicular pain syndromes (I)<br><br>Prolotherapy injections for subacute cervicothoracic pain with or without radicular pain syndromes (I)<br><br>Percutaneous discectomy (nucleoplasty), laser discectomy, and disc coblation therapy (I)<br><br>Discectomy for subacute cervical pain or thoracic pain without radiculopathy (I) |
| Chronic Cervicothoracic Pain | Educational programs for select patients (I)<br><br>Sleep posture which is most comfortable for the patient is recommended. If a patient habitually chooses a particular sleep posture, it may be reasonable to recommend altering posture to determine if there is a reduction in pain or other symptoms. (I)<br><br>Aerobic exercise (I)<br><br>Stretching (C)<br><br>Strengthening, endurance, and aerobic exercises (B)<br><br>Inclusion of fear avoidance belief training during the course of rehabilitation (I)<br><br>NSAIDs (I)<br><br>Proton pump inhibitors or misoprostol for patients at substantially increased risk for gastrointestinal bleeding (A)<br><br>Sucralfate for patients at substantially | Educational programs and education for prevention of cervicothoracic pain (I)<br><br>Use of specific commercial products (e.g., neck pillows) (I)<br><br>Stretching exercises as an isolated prescription or program for preventing cervicothoracic pain (I)<br><br>Aquatic therapy (I)<br><br>Yoga (I)<br><br>Creams and ointments (I)<br><br>Thiocolchicoside (I)<br><br>Willow bark (Salix), ginger extract, rose hips, camphora molmol, maleluca alternifolia, angelica sinensis, aloe vera, thymus officinalis, menthe peperita, arnica montana, curcuma longa, tancaetum parthenium, and zingiber officinicalis, avocado soybean unsaponifiables, oral enzymes, topical copper salicylate, S-Adenosylmethionine, and diacerin harpagoside | Rest (I)<br><br>Selective serotonin reuptake inhibitors, (e.g., paroxetine, as well as bupropion and trazodone) (I)<br><br>Gabapentin for chronic non-neuropathic pain or cervicothoracic pain (I)<br><br>Oral and intravenous colchicines (I)<br><br>Glucocorticosteroids for chronic cervicothoracic pain without radicular pain (I)<br><br>Muscle relaxants (I)<br><br>Routine use of opioids for chronic non- |

| Cervicothoracic Disorder | increased risk for gastrointestinal bleeding (B)<br>Treatment with Evidence Rating/Recommendation Level | (I)<br>No Recommendation | malignant pain conditions (C)<br>Not Recommended |
|---|---|---|---|
| | Recommended<br>H2 blockers for patients at substantially increased risk for gastrointestinal bleeding (C)<br><br>Patients with known cardiovascular disease or multiple risk factors for cardiovascular disease should have the risks and benefits of NSAID therapy for pain discussed. (I) Acetaminophen or aspirin as the first-line therapy appear to be the safest to use for these patients. (A)<br><br>Acetaminophen for cervicothoracic pain with or without radicular symptoms, particularly for those with contraindications for NSAIDs (I)<br><br>Norepinephrine reuptake inhibitor antidepressants (TCAs) and dual reuptake inhibitors (SNRIs) – e.g., amitriptyline, imipramine, nortriptyline, maprotiline, doxepin, duloxetine, venlafaxine (C)<br><br>Topiramate for limited use in select patients as a fourth- or fifth-line agent (I)<br><br>Capsaicin (capsicum) for temporary flare-ups of chronic cervicothoracic pain (I)<br><br>Opioids for select patients (I)<br><br>Acupuncture for select use in chronic cervicothoracic pain with or without radicular symptoms as an adjunct to facilitate more effective treatments (C)<br><br>Heat therapy, including a heat wrap (C)<br><br>Manipulation/mobilization of the cervical and/or thoracic spine for short-term relief of cervical pain (B)<br><br>Massage for select use in chronic cervicothoracic pain as an adjunct to more efficacious treatments consisting primarily of a graded aerobic and strengthening exercise program (C)<br><br>TENS for select use as an adjunct for more efficacious, active treatments (C)<br><br>Chronic pain management/functional restoration programs for chronic spinal pain, particularly those programs that focus on functional outcomes (I) | Magnets (I)<br><br>Infrared therapy (I)<br><br>Ultrasound (I)<br><br>Low-level laser therapy (I)<br><br>Use of radiofrequency neurotomy, neurotomy, and facet rhizotomy for chronic cervicothoracic pain confirmed with diagnostic blocks, but who do not have radiculopathy and who have failed conservative treatment (I)<br><br>Radiofrequency lesioning of the dorsal root ganglia for chronic cervical pain with or without radiculopathy (I)<br><br>Vertebroplasty for highly select patients with low back or thoracic pain due to unusual vertebral compression fractures (I)<br><br>Kyphoplasty for patients with low back or thoracic pain due to vertebral compression fractures (I) | Not Recommended<br>Vitamins (I)<br><br>Routine use of cryotherapies in health care provider offices or home use of a high-tech device (I)<br><br>Diathermy (C)<br><br>Regular or routine manipulation or mobilization, prolonged treatment manipulation several times a month for years), and prophylactic treatment (I)<br><br>MUA and MASM (I)<br><br>Mechanical devices for administering massage (I)<br><br>Myofascial release (I)<br><br>Neuroreflexotherapy for chronic cervicothoracic pain with or without radicular pain (I)<br><br>Subcutaneous carbon-dioxide insufflations for chronic cervicothoracic pain with or without radiculopathy (B)<br><br>Traction (C)<br><br>Interferential therapy for chronic cervicothoracic pain with or without radicular pain (I)<br><br>Iontophoresis (I)<br><br>Microcurrent electrical stimulation for chronic cervicothoracic pain with or without radicular pain syndromes (I) |

| Cervicothoracic Disorder | Treatment with Evidence Rating/Recommendation Level | | |
|---|---|---|---|
| | Recommended | No Recommendation | Not Recommended |
| | Work conditioning/work hardening for chronic cervicothoracic pain with or without radicular pain syndromes (I)<br><br>Participatory ergonomic programs, where available, for highly select patients with chronic cervicothoracic pain who remain off work or on a different job and where there is managerial support and interest (I)<br><br>Cognitive behavioral therapy as a component of a formal interdisciplinary program (I)<br><br>Fear avoidance belief training, particularly if there are any suggestions of fear avoidance belief issues (I)<br><br>A multidisciplinary rehabilitation program with a focus on cognitive behavioral, occupational, and activity-based approaches combined with aerobic exercise and other conditioning exercise for patients with chronic cervicothoracic pain who are not working due to cervicothoracic pain (I)<br><br>A multidisciplinary rehabilitation program with a participatory ergonomics team for patients with chronic cervicothoracic pain with lost-time injuries (I) | | High voltage galvanic therapy for chronic cervicothoracic pain (I)<br><br>Botulinum injections for non-specific chronic cervical pain (C)<br><br>Epidural steroid injections for chronic cervicothoracic pain with radicular symptoms (C)<br><br>Continuous infusion of corticosteroids and local anesthetic for chronic cervicothoracic pain with or without radiculopathy (I)<br><br>Epidural glucocorticosteroid injections for chronic cervical pain in the absence of significant radicular symptoms (I)<br><br>Facet joint injections with hyaluronic acid for chronic cervicothoracic pain with or without radicular pain syndromes (I)<br><br>Intradiscal electrothermal therapy for chronic cervicothoracic pain with or without radicular pain syndromes (I)<br><br>Percutaneous intradiscal radiofrequency thermocoagulation for chronic cervicothoracic pain with or without radicular pain syndromes (I)<br><br>Prolotherapy injections for chronic cervicothoracic pain with or without radicular pain |

| Cervicothoracic Disorder | Treatment with Evidence Rating/Recommendation Level | | |
|---|---|---|---|
| | Recommended | No Recommendation | Not Recommended |
| | | | syndromes (I)<br><br>Percutaneous discectomy (nucleoplasty), laser discectomy, and disc coblation therapy (I)<br><br>Discectomy for chronic cervical or thoracic pain without radiculopathy (I)<br><br>Cervical fusion for chronic non-specific cervical pain (I)<br><br>Disc replacement for chronic non-specific cervical pain or other spinal pain syndromes (I)<br><br>Vertebroplasty as a routine treatment for patients with low back or thoracic pain due to vertebral compression fractures (A)<br><br>Spinal cord stimulators for chronic cervicothoracic pain with or without radiculopathy (I) |
| Peri-operative Pain | Gabapentin for peri-operative management of pain to reduce need for opioids, particularly in patients with adverse effects from opioids (I) | | |
| Post-operative Cervicothoracic Pain | Aerobic exercise (I)<br><br>NSAIDs (I)<br><br>Muscle relaxants as second- or third-line agents for acute post-surgical patients (I)<br><br>Judicious use of opioids (I) | | Vitamins (I) |
| Radicular Pain Syndromes | Educational programs for select patients (I)<br><br>NSAIDs (I)<br><br>Proton pump inhibitors or misoprostol for patients at substantially increased risk for gastrointestinal bleeding (A)<br><br>Sucralfate for patients at substantially increased risk for gastrointestinal bleeding | Gabapentin for chronic radicular pain syndromes (I)<br><br>Infrared therapy (I)<br><br>Manipulation for radicular pain syndromes without neurologic deficits (I) | Rest (I)<br><br>In the absence of documented deficiencies or other nutritional deficit states, use of vitamins is not recommended (I) |

| Cervicothoracic Disorder | Treatment with Evidence Rating/Recommendation Level | | |
|---|---|---|---|
| | (B)<br>Recommended | No Recommendation | Routine use of acupuncture for acute radicular pain (I)<br>Not Recommended |
| | H2 blockers for patients at substantially increased risk for gastrointestinal bleeding (C)<br><br>Patients with known cardiovascular disease or multiple risk factors for cardiovascular disease should have the risks and benefits of NSAID therapy for pain discussed (I). Acetaminophen or aspirin as the first-line therapy appears to be the safest to use for these patients (A).<br><br>Acetaminophen for cervicothoracic pain with or without radicular symptoms, particularly for those with contraindications for NSAIDs (I)<br><br>Norepinephrine reuptake inhibitors (TCAs) and dual reuptake inhibitors (SNRIs) (I)<br><br>Carbamazepine as a potential adjunct as a fourth- or fifth-line treatment for chronic radicular pain after attempting other treatments – e.g., different NSAIDs, aerobic exercise, other exercise, manipulation (I)<br><br>Glucocorticosteroids for acute severe radicular pain syndromes for purposes of obtaining a short-term reduction in pain (I)<br><br>Muscle relaxants as second-or third-line agents for acute severe radicular pain syndromes (I)<br><br>Massage for chronic radicular syndromes in which cervicothoracic pain is a substantial symptom component (I)<br><br>An epidural glucocorticosteroid injection as an option for acute or subacute radicular pain syndromes (I)<br><br>Cervical discectomy with fusion to speed recovery in patients with chronic radiculopathy due to ongoing nerve root compression who continue to have significant pain and functional limitation after at least 6 weeks of time and appropriate non-operative therapy (I)<br><br>Thoracic discectomy for treatment of patients with ongoing nerve root compression who continue to have significant pain and functional limitation after at least 3 months of time and appropriate | | Manipulation for radicular pain syndromes with acute neurological deficits (I)<br><br>Myofascial release (I)<br><br>Neuroreflexotherapy for chronic cervicothoracic pain with or without radiculopathy (I)<br><br>Subcutaneous carbon-dioxide insufflation for chronic cervicothoracic pain with or without radiculopathy (B)<br><br>Traction (C)<br><br>Iontophoresis (I)<br><br>Microcurrent electrical stimulation for chronic cervicothoracic pain with or without radicular pain syndromes (I)<br><br>TENS for acute radicular pain syndromes (I)<br><br>Cervical discectomy for acute radiculopathy (under 4 weeks' duration) unless objective evidence of a progressive neurological deficit or myelopathy is present (I)<br><br>Percutaneous discectomy (nucleoplasty), laser discectomy, and disc coblation therapy (I) |

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|---|---|---|---|
| Cervicothoracic Disorder | non-operative therapy (I)<br>Treatment with Evidence Rating/Recommendation Level | | |
| | Recommended | No Recommendation | Not Recommended |
| | Artificial disc replacement for subacute or chronic radiculopathy (B) | | |
| Cervicogenic Headache | Spinal manipulation of the cervical and/or thoracic spine for chronic cervicogenic headache pain (C) | | Cervical manipulation for tension headaches (C)<br>Botulinum injections for tension or cervicogenic headaches (C)<br>Radiofrequency neurotomy (B) |
| Whiplash-associated Injury | Glucocorticosteroids for acute whiplash injury Grades II and III (C) | | |
| Myelopathy | Artificial disc replacement (B)<br>Decompressive surgery (laminoplasty, laminectomy, discectomy with fusion) (I) | | |
| Neuropathic Pain | Carbamazepine as a potential adjunct as a fourth- or fifth-line treatment for chronic neuropathic pain after attempting other treatments (e.g., different NSAIDs, aerobic exercise, other exercise, manipulation) (I) | | Topiramate for neuropathic pain, including peripheral neuropathy (I) |
| Spinal Stenosis | Decompression with fusion for patients with symptomatic spinal stenosis that is intractable to non-operative management (I) | | |
| Spondylolisthesis | Fusion for degenerative spondylolisthesis (C)<br>Spinal fusion as an option at the time of discectomy if a patient is having a simultaneous discectomy on the same disc (I) | | Pulsed electromagnetic field stimulation for cervical spine fusion as a routine treatment for cervical spine fusion patients, including patients with multiple spine fusion levels or in smokers (C)<br>Autologous platelet gel for cervical spine fusion (C) |
| Chronic Non-specific Cervical Pain | | | Cervical fusion (I)<br>Disc replacement (I) |

Definitions:

Strength of Evidence Ratings

A = Strong evidence-base: Two or more high-quality studies.*

B = Moderate evidence-base: At least one high-quality study or multiple moderate-quality studies** relevant to the topic and the working population.

C = Limited evidence-base: At least one study of moderate quality.

I = Insufficient evidence: Evidence is insufficient or irreconcilable.

*For therapy and prevention, randomized controlled trials (RCTs) or crossover trials with narrow confidence intervals and minimal heterogeneity. For diagnosis and screening, cross sectional studies using independent gold standards. For prognosis, etiology, or harms, prospective cohort studies with minimal heterogeneity.

**For therapy and prevention, well-conducted cohort studies. For prognosis, etiology, or harms, well-conducted retrospective cohort studies or untreated control arms of RCTs.

Strength of Recommendations

| Recommendation | Evidence Rating | Description of Category |
|---|---|---|
| Strongly Recommended | A | The intervention is strongly recommended for appropriate patients. The intervention improves important health and functional outcomes based on high quality evidence, and the Evidence-Based Practice Panel (EBPP) concludes that benefits substantially outweigh harms and costs. |
| Moderately Recommended | B | The intervention is recommended for appropriate patients. The intervention improves important health and functional outcomes based on intermediate quality evidence that benefits substantially outweigh harms and costs. |
| Recommended | C | The intervention is recommended for appropriate patients. There is limited evidence that the intervention may improve important health and functional benefits. |
| Insufficient - Recommended (Consensus-based) | I | The intervention is recommended for appropriate patients and has nominal costs and essentially no potential for harm. The EBPP feels that the intervention constitutes best medical practice to acquire or provide information in order to best diagnose and treat a health condition and restore function in an expeditious manner. The EBPP believes based on the body of evidence, first principles, or collective experience that patients are best served by these practices, although the evidence is insufficient for an evidence-based recommendation. |
| Insufficient - No Recommendation (Consensus-based) | I | The evidence is insufficient to recommend for or against routinely providing the intervention. The EBPP makes no recommendation. Evidence that the intervention is effective is lacking, of poor quality, or conflicting and the balance of benefits, harms, and costs cannot be determined. |
| Insufficient - Not Recommended (Consensus-based) | I | The evidence is insufficient for an evidence-based recommendation. The intervention is not recommended for appropriate patients because of high costs or high potential for harm to the patient. |
| Not Recommended | C | Recommendation against routinely providing the intervention. The EBPP found at least intermediate evidence that harms and costs exceed benefits based on limited evidence. |
| Moderately Not Recommended | B | Recommendation against routinely providing the intervention to eligible patients. The EBPP found at least intermediate evidence that the intervention is ineffective, or that harms or costs outweigh benefits. |
| Strongly Not Recommended | A | Strong recommendation against providing the intervention to eligible patients. The EBPP found high quality evidence that the intervention is ineffective, or that harms or costs outweigh benefits. |

## Clinical Algorithm(s)

The following clinical algorithms are provided in the original guideline document:

- ACOEM Guidelines for Care of Acute and Subacute Cervical and Thoracic Spine Pain
- Initial Evaluation of Acute and Subacute Cervical and Thoracic Spine Pain
- Initial and Follow-up Management of Acute and Subacute Cervicothoracic and Cervical Radiculopathy Pain
- Evaluation of Subacute or Slow-to-Recover Patients with Cervicothoracic Pain Unimproved or Slow-to-Improve (Symptoms >4 Weeks)
- Surgical Considerations for Patients with Anatomic and Physiologic Evidence of Nerve Root Compression and Persistent Cervicothoracic Symptoms
- Further Management of Subacute Cervicothoracic Pain
- Further Management of Chronic Cervicothoracic Pain

# Scope

## Disease/Condition(s)

Cervical and thoracic spine disorders

## Guideline Category

Diagnosis

Evaluation

Management

Rehabilitation

Treatment

## Clinical Specialty

Chiropractic

Family Practice

Internal Medicine

Neurological Surgery

Neurology

Physical Medicine and Rehabilitation

Preventive Medicine

Surgery

## Intended Users

Advanced Practice Nurses

Allied Health Personnel

Chiropractors

Health Care Providers

Nurses

Occupational Therapists

Physical Therapists

Physician Assistants

Physicians

Utilization Management

## Guideline Objective(s)

- To describe evidence-based best practices for key areas of occupational medical care and disability management
- To improve or restore the health of workers with occupationally related illnesses or injuries
- To improve the quality of occupational medical care and disability management

## Target Population

Adults with potentially work-related cervical and thoracic spine problems seen in primary care settings

## Interventions and Practices Considered

Diagnosis/Evaluation

1. X-ray
2. Magnetic resonance imaging (MRI)

Management/Treatment

1. Activity modification/exercise
    - Sleep posture
    - Stretching exercises
    - Strengthening, endurance, and aerobic exercises
    - Fear avoidance belief training
2. Medications
    - Non-steroidal anti-inflammatory drugs
    - Proton pump inhibitors, misoprostol, sucralfate, H2 blockers
    - Aspirin
    - Acetaminophen
    - Antidepressants (norepinephrine reuptake inhibitor antidepressants [tricyclic anti-depressants], serotonin and norepinephrine reuptake inhibitors [dual reuptake inhibitors])
    - Carbamazepine
    - Gabapentin
    - Topiramate
    - Capsaicin (topical)
    - Systemic glucocorticosteroids
    - Muscle relaxants
    - Opioids
3. Physical methods
    - Acupuncture
    - Cryotherapy
    - Heat therapy

    - Manipulation/mobilization
    - Massage
4. Transcutaneous electrical nerve stimulation (TENS)
5. Epidural glucocorticosteroid injection
6. Surgery
    - Cervical discectomy with fusion
    - Thoracic discectomy
    - Artificial disc replacement
    - Decompressive surgery (laminoplasty, laminectomy, discectomy with fusion, spinal fusion)
7. Rehabilitation (chronic pain management/functional restoration programs, work conditioning/work hardening, participatory ergonomic programs, multidisciplinary rehabilitation programs)
8. Behavioral interventions (cognitive behavioral therapy, fear avoidance belief training)
9. Patient education

## Major Outcomes Considered

- Sensitivity and specificity of diagnostic tests
- Rates of symptom alleviation and cure
- Time to return to work

# Methodology

## Methods Used to Collect/Select the Evidence

Hand-searches of Published Literature (Primary Sources)

Searches of Electronic Databases

## Description of Methods Used to Collect/Select the Evidence

Searches for evidence for the development of American College of Occupational and Environmental Medicine (ACOEM) evidence-based products and services primarily emphasize a search for high- or moderate-quality original studies. Primary databases searched were:

1. The National Library of Medicine's MEDLARS database (Medline) (www.nlm.nih.gov )
2. EBM Online (www.bmjjournals.com )
3. The Cochrane Central Register of Controlled Trials (http://www.thecochranelibrary.com/view/0/index.html )
4. TRIP Database (www.tripdatabase.com )
5. CINAHL (nursing, allied health, physical therapy, occupational therapy, social services: http://www.cinahl.com/wpages/login.htm )
6. EMBASE (www.embase.com/ )
7. PEDro (www.pedro.fhs.usyd.edu.au/ )

Ranking and Preliminary Screening of Studies

Primary sources selected for inclusion in the evidence base for ACOEM products and services are limited to those with the strongest apparent study design, pending quality rating. The strength and quality of study design are determined by ranking and rating of the studies according to accepted methods. Generally accepted ranking of study design for diagnostic testing and clinical treatment methods were modified by the Guideline Methodology Committee (GMC). Systematic reviews in general are not ranked as the best design in reality, as most reviews located during pilot testing of the Methodology, with the exception of many (but not all) Cochrane reviews, did not use systematic searches or quality assessments of included studies. The GMC also excluded level 4 evidence from consideration (case series, poor-quality cohort studies, poor-quality case-control studies, expert opinion without explicit critical appraisal, and expert opinion based on physiology, bench research, first principles). The focus was on the best-designed original studies, pending quality grading. For example, studies of diagnostic tests are generally limited to those compared to

an acceptable gold standard, and those reporting sensitivity and specificity. Studies of clinical treatment methods are generally limited to randomized controlled trials or crossover trials. Additional literature was also reviewed when there was a paucity of higher-grade literature or if it was brought to the Evidence-based Practice Panel's (EBPP's) attention from interested parties.

To narrow the data discovered in the search to that which will be acceptable for further analysis and quality rating, researchers use additional preliminary screening criteria for original research.

Criteria for Inclusion in Study Rating and Critical Analysis of Studies of Diagnosis/Clinical Assessment Methods

1. Evaluate the efficacy (i.e., clinical accuracy) of the assessment method (i.e., the "test") in a group that contains subjects both with and without the condition the test is intended to assess.
2. Be a prospective cohort study or an arm of a randomized controlled trial (RCT).
3. Compare the findings of the assessment method (test) to an adequate reference standard for all subjects (not just subjects who tested positive).

Criteria for Inclusion in Study Rating and Critical Analysis of Studies of Treatment Efficacy

1. Evaluate a group of subjects with a representative spectrum of the clinical condition of interest.
2. Be an RCT evaluating clinical outcomes in a group receiving the intervention compared to a comparison group receiving either no intervention or a different intervention.
3. Evaluate functional outcomes that are important to a patient's overall health or well being or are important to society.

Searches are documented, listing the database searched, the search terms, article type and limits, the time frame searched (in this case, all years in the databases), the number of studies found, the number reviewed in detail, and the number included in the systematic analysis. Despite multiple database searches, many additional studies are discovered in exhaustive manual searches of article reference lists.

## Number of Source Documents

Not stated

## Methods Used to Assess the Quality and Strength of the Evidence

Weighting According to a Rating Scheme (Scheme Given)

## Rating Scheme for the Strength of the Evidence

Strength of Evidence Ratings

A = Strong evidence-base: Two or more high-quality studies*

B = Moderate evidence-base: At least one high-quality study or multiple moderate-quality studies** relevant to the topic and the working population

C = Limited evidence-base: At least one study of moderate quality

I = Insufficient evidence: Evidence is insufficient or irreconcilable

*For therapy and prevention, randomized controlled trials (RCTs) or crossover trials with narrow confidence intervals and minimal heterogeneity. For diagnosis and screening, cross sectional studies using independent gold standards. For prognosis, etiology, or harms, prospective cohort studies with minimal heterogeneity.

**For therapy and prevention, well-conducted cohort studies. For prognosis, etiology, or harms, well-conducted retrospective cohort studies or untreated control arms of RCTs.

## Methods Used to Analyze the Evidence

Review of Published Meta-Analyses

Systematic Review with Evidence Tables

## Description of the Methods Used to Analyze the Evidence

Study Assessment and Quality Rating

Studies are first abstracted into evidence tables for easier assessment. See Appendix B in the methodology companion (see the "Availability of Companion Documents" field) for a sample of an evidence table for treatment studies. Each study is formally graded for quality using a modification of the most recent assessment scheme proposed by the Cochrane Collaboration Back Group, as shown in the table below. The studies are quality rated using a 0, 0.5, 1 grade for each item, where 0 = does not fulfill the requirement; 0.5 = partially fulfills the requirement and 1 = entirely fulfills the requirement. A study with a score less than 4.0 is rated as a poor-quality study; a study with a score between 4.0 and 7.5 is rated as a moderate-quality study. A study with a score of 8.0 or greater is rated as a high-quality study.

Rating Criteria for Randomized Controlled Trials of Treatment Studies

| Criterion | Description |
|---|---|
| Randomization | Assessment of the degree that randomization was both reported to have been performed and successfully achieved through analyses of comparisons of variables between the treatment and control groups |
| Treatment allocation concealed | Concealment of the allocation of patients to various arms of the study from all involved, including patients, clinicians, and researchers |
| Baseline comparability | Measures how comparable the baseline groups are (e.g., age, gender, prior treatment) |
| Patient blinded | The patient is not aware which group he or she is in |
| Provider blinded | The provider is not aware which treatment he or she is delivering |
| Assessor blinded | The researcher is not aware which group the results apply to |
| Co-interventions avoided | The degree to which the study design avoided multiple interventions at the same time |
| Compliance acceptable | Measures the degree of noncompliance with the treatment protocol |
| Dropout rate | Measures the dropout rate at different periods of time |
| Timing of assessments | Assessments and reassessments should be performed at the same time from inception for all study groups |
| Analyzed by intention to treat | Whether the study data was analyzed with an "intention to treat" analysis |

## Methods Used to Formulate the Recommendations

Expert Consensus

Expert Consensus (Nominal Group Technique)

## Description of Methods Used to Formulate the Recommendations

Each recommendation includes citations of the specific scientific literature which supports the recommendation. The recommendations explicitly consider the health benefits, side effects, and risks of the proposed recommendation. Recommendations include the data elements described

below.

Content of Recommendations for Diagnostic Testing or Treatment

1. The diagnoses for which the test or treatment is indicated
2. The specific indications for the test or treatment
3. The point in the time course of the problem for which it is appropriate
4. Prior conservative treatment that should be tried first
5. Relative and absolute contraindications to the test or procedure
6. The number of tests or procedures that are appropriate at a given time in the course of the problem
7. The potential benefits of the test or procedure
8. The potential harms, including effects on disability and return to work

The Evidence-based Practice Panels (EBPPs) for each topic area review and discuss draft practice recommendations from the research staff that includes a review of the quality evidence, evidence tables, and summaries. The strength of evidence rating is confirmed by the EBPP responsible for the topic, with review by the Guideline Methodology Committee (GMC). EBPP members may present additional comments related to their clinical opinions and experience for panel consideration. If a unanimous decision is not possible, an EPPP may vote on the rating of the strength of the evidence to determine a consensus. Dissenters to the consensus may draft minority opinions about the strength of evidence. In practice, this has not happened as recommendations have been unanimous.

Formulation of recommendations requires clinical judgment as well as a full evaluation and consideration of the available high-quality evidence. To aid in framing recommendations, the GMC developed a list of "First Principles" based on the Hippocratic Oath ("First Do No Harm"), medical logic, appropriate sequencing and case management, shared decision-making, support of functional recovery, and relative cost-effectiveness. The First Principles are defined in Table 7 in the methodology companion (see the "Availability of Companion Documents" field). When there is insufficient high-quality evidence of effectiveness or efficacy, or the high-quality evidence is conflicting, and to guide recommendations for alternative tests or treatments when there are several options, these principles are used to guide group decision-making.

The EBPPs then assign a Strength of Recommendation to each recommendation. If a consensus cannot be reached on the recommendation or strength of recommendation, the EBPPs may use nominal group voting if agreement is not possible in the discussion. Once a consensus is reached, the EBPPs will finalize the language and strength rating of the recommendation. If needed and material, a minority opinion can be appended to the recommendation.

## Rating Scheme for the Strength of the Recommendations

Strength of Recommendations

| Recommendation | Evidence Rating | Description of Category |
|---|---|---|
| Strongly Recommended | A | The intervention is strongly recommended for appropriate patients. The intervention improves important health and functional outcomes based on high quality evidence, and the Evidence-Based Practice Panel (EBPP) concludes that benefits substantially outweigh harms and costs. |
| Moderately Recommended | B | The intervention is recommended for appropriate patients. The intervention improves important health and functional outcomes based on intermediate quality evidence that benefits substantially outweigh harms and costs. |
| Recommended | C | The intervention is recommended for appropriate patients. There is limited evidence that the intervention may improve important health and functional benefits. |
| Insufficient - Recommended (Consensus-based) | I | The intervention is recommended for appropriate patients and has nominal costs and essentially no potential for harm. The EBPP feels that the intervention constitutes best medical practice to acquire or provide information in order to best diagnose and treat a health condition and restore function in an expeditious manner. The EBPP believes based on the body of evidence, first principles, or collective experience that patients are best served by these practices, although the evidence is insufficient for an evidence-based recommendation. |
| Insufficient - No | I | The evidence is insufficient to recommend for or against routinely providing the intervention. The EBPP |

| Recommendation (Consensus-based) | Evidence Rating | Description of Category |
|---|---|---|
| | | makes no recommendation. Evidence that the intervention is effective is lacking, of poor quality, or conflicting and the balance of benefits, harms, and costs cannot be determined. |
| Insufficient - Not Recommended (Consensus-based) | I | The evidence is insufficient for an evidence-based recommendation. The intervention is not recommended for appropriate patients because of high costs or high potential for harm to the patient. |
| Not Recommended | C | Recommendation against routinely providing the intervention. The EBPP found at least intermediate evidence that harms and costs exceed benefits based on limited evidence. |
| Moderately Not Recommended | B | Recommendation against routinely providing the intervention to eligible patients. The EBPP found at least intermediate evidence that the intervention is ineffective, or that harms or costs outweigh benefits. |
| Strongly Not Recommended | A | Strong recommendation against providing the intervention to eligible patients. The EBPP found high quality evidence that the intervention is ineffective, or that harms or costs outweigh benefits. |

## Cost Analysis

The guideline developers reviewed published cost analyses.

## Method of Guideline Validation

Clinical Validation-Pilot Testing

External Peer Review

Internal Peer Review

## Description of Method of Guideline Validation

Internal Quality Review

The Guideline Methodology Committee (GMC) assigns a committee member to each Evidence Based Practice Panel (EBPP) as a methodology consultant to assist with adherence to this methodology. The GMC reviews all recommendations for which there are questions about consistency with the defined methodology. If the GMC determines that the approved methodology has not been followed, leading to illogical or untenable recommendations, the GMC engages in direct discussions with the EBPP to reach agreement on revision. If there is no agreement or revision, then the matter will be considered by the American College of Occupational and Environmental Medicine (ACOEM) Board of Directors when the document is submitted for Board review.

External Review

ACOEM conducts external peer review of the ACOEM *Occupational Medicine Practice Guidelines* (APGs) and periodic revisions to 1) assure that all relevant high-quality scientific literature has been found, 2) assure that the important evidence from the relevant scientific literature has been accurately interpreted, 3) solicit opinions on whether the findings and recommendation statements are appropriate and consistent with the evidence, and 4) obtain general information on the conclusions and presentation of materials from external topic experts. Professional and patient organizations, as well as panel members, ACOEM Board of Directors, etc., are invited to nominate external peer reviewers.

Peer reviewers are asked to comment on the completeness of the scientific literature evaluation in their topic area, the clarity and technical accuracy of the APGs evaluation and summary of the evidence, and the appropriateness of the Guideline findings and recommendation statements.

Stakeholder Input

In a cyclical manner, ACOEM will seek stakeholder input to understand the needs and preferences of those who may utilize or be affected by the use of clinical practice guidelines in workplace settings and in the workers' compensation system. ACOEM solicits input from clinicians, health care systems, workers or patients, employers, utilization reviewers, case managers, insurers and third party administrators, attorneys, regulators, and

policy makers through a variety of mechanisms. Stakeholders will be asked for comments about their experience using existing clinical practice guidelines and related products and their suggestions for future improvements. They are also asked for input on the use of clinical practice guidelines in clinical care, case management, claim administration, claim adjudication, and in the development of policies and regulations.

To ensure editorial independence in the development process, the stakeholder groups will be asked for input about the APGs, but will not be informed of panel deliberations or shown drafts of practice recommendations before the formal release of the documents. In some cases, a member of a stakeholder group may participate as a member of a Guideline EBPP or may participate in peer review or pilot testing. However, all individuals involved in the APGs development, peer review, and pilot testing are asked to keep all information about the panel's deliberations and conclusions confidential until the APGs are formally released.

Pilot Testing

The guidelines are pilot tested to determine if the recommendations are clear, easy to use, and are generally useful. Pilot testers are not asked if they think the recommendations or process for development was appropriate.

Review by the GMC and the ACOEM Board of Directors

During the entire evidence-based product development process, the GMC will work with the Panels, editors, and research staff to ensure that the evidence-based product methodology is being followed, both in the literature evaluation process and development of conclusion and recommendation statements. The Board of Directors has an opportunity to comment on the Guidelines during the external review period. Their comments are reviewed by the Panel and any necessary changes are made to the Guidelines.

# Evidence Supporting the Recommendations

## Type of Evidence Supporting the Recommendations

The type of supporting evidence is identified and graded for each recommendation (see the "Major Recommendations" field).

# Benefits/Harms of Implementing the Guideline Recommendations

## Potential Benefits

- Accurate assessment and diagnosis of the patient's medical condition and specific cervical or thoracic complaint
- Improved symptoms including pain, functionality, and disability
- Return-to-work programs are thought to reduce morbidity and improve function.

## Potential Harms

- Changing sleep posture has the potential for increasing symptoms.
- Aerobic exercise should be adjusted, reduced, or discontinued when there is intolerance (rarely occurs) or development of other disorders.
- Stretching exercises may be performed passively or with assistance of a provider, but the latter should be performed carefully to not exceed the patient's natural range of motion and incur an injury. There are concerns that over-stretching may result in additional injuries to patients.
- In the process of strengthening, sustaining a strain is possible.
- There is the potential for some non-steroidal anti-inflammatory drugs (NSAIDs) to increase the risk of cardiovascular events.
- Topiramate and carbamazepine require careful monitoring of patients due in part to elevated risks for central nervous system (CNS) sedating adverse effects.
- Gabapentin carries a slight risk of abuse. Careful monitoring of patients is indicated due in part to elevated risks for CNS-sedating adverse effects.
- There is evidence that capsaicin compounds should not be used chronically due to reported adverse effects on neurons.
- Adverse effects of systemic glucocorticosteroids include osteonecrosis (avascular necrosis), particularly from long-term administration, and diabetics will have worsened glucose control; thus, the benefits must be carefully weighed against these risks.
- Skeletal muscle relaxants produce symptoms of CNS sedation or depression, thus significantly limiting their utility. There is also a low but

definite risk of abuse.

- There are significant, potentially serious adverse effects with opioids including somnolence, tolerance, dependence, and addiction, which can lead to abuse.
- Reported fatal outcomes have occurred and are particularly attributed to cervical manipulation. Reports of more severe but rare adverse effects include vertebrobasilar dissection, carotid artery injury, and disc herniation or spinal cord compression myelopathy, although these reports need to be considered in the context of natural progressions of cervical pain without any intervention. The most common adverse response to neck manipulation is local discomfort that resolves within 24 to 48 hours. There are a number of reports of vertebral artery dissection that result in posterior circulation stroke that have been reported to have occurred following cervical manipulation that has led to some concern.
- For transforaminal epidural glucocorticosteroid injections (ESI), complications rarely occur, but include infection (meningitis, epidural abscess, etc.) and hemorrhage related to penetration of an anatomical variant artery, nerve root injury, vertebral artery dissection, paralysis, and stroke. Due to proximity of the spinal cord, ESIs in the cervical spine are thought to have a higher adverse effect profile. A resulting epidural hematoma may compress the nerve or spinal cord and generally requires emergency surgery.
- Complications from surgical interventions

# Contraindications

## Contraindications

There are no specific contraindications to manipulation under anesthesia (MUA) beyond those of its individual components (e.g., anesthesia and spinal manipulative therapy [SMT]). These contraindications include spinal malignancy, hypermobility, instability, acute inflammation, infection, fracture, progressive neurological deficits, large aortic aneurysms, bleeding disorders, severe osteoporosis, acute gout, spinal cord compression, several canal stenosis, sequestered nucleus pulposus, or cardiopulmonary conditions precluding anesthesia. It has also been suggested that procedures such as MUA are not appropriate for patients who could improve with a simpler, more cost effective therapy that does not involve anesthesia.

# Qualifying Statements

## Qualifying Statements

The American College of Occupational and Environmental Medicine (ACOEM) provides this segment of guidelines for practitioners and notes that decisions to adopt particular courses of actions must be made by trained practitioners on the basis of the available resources and the particular circumstances presented by the individual patient. Accordingly, the ACOEM disclaims responsibility for any injury or damage resulting from actions taken by practitioners after considering these guidelines.

# Implementation of the Guideline

## Description of Implementation Strategy

An implementation strategy was not provided.

## Implementation Tools

Clinical Algorithm

Mobile Device Resources

For information about availability, see the *Availability of Companion Documents* and *Patient Resources* fields below.

# Institute of Medicine (IOM) National Healthcare Quality Report Categories

## IOM Care Need

Getting Better

Living with Illness

## IOM Domain

Effectiveness

Patient-centeredness

# Identifying Information and Availability

## Bibliographic Source(s)

Cervical and thoracic spine disorders. In: Hegmann KT, editor(s). Occupational medicine practice guidelines. Evaluation and management of common health problems and functional recovery in workers. 3rd ed. Elk Grove Village (IL): American College of Occupational and Environmental Medicine (ACOEM); 2011. p. 1-332.

## Adaptation

Not applicable: The guideline was not adapted from another source.

## Date Released

2011

## Guideline Developer(s)

American College of Occupational and Environmental Medicine - Medical Specialty Society

## Source(s) of Funding

American College of Occupational and Environmental Medicine

## Guideline Committee

Evidence-based Practice Cervical and Thoracic Spine Panel

## Composition of Group That Authored the Guideline

*Panel Members*: James B. Talmage, MD, FACOEM (*Chair*); Gunnar B. J. Andersson, MD, PhD; Eugene Carragee, MD; Ronald Donelson,

MD, MS; Marjorie Eskay-Auerbach, MD, JD; Jill Galper, PT, MEd; Elizabeth Genovese, MD, MBA, FACOEM (deceased); Michael Goertz, MD, MPH, FACOEM; Scott Haldeman, MD, DC, PhD, FRCP(C), FAAN, FCCS; Paul D. Hooper, DC, MPH, MS; Donald R. Murphy, DC, DACAN; William G. Tellin, DC, DABCO; Russell Travis, MD; Michael S. Weiss, MD, MPH, FACOEM, FAAPMR, FAANEM

## Financial Disclosures/Conflicts of Interest

James B. Talmage, MD, FACOEM

Occupational Health Center LLC, Cookeville, Tennessee; Adjunct Associate Professor, Division of Occupational Medicine, Meharry Medical College

*National, Regional, Local Committee Affiliations*—Member, Return to Work Committee, ACOEM; Editorial Advisory Board, Tennessee Workers' Comp Reporter; Editorial Board, Tennessee Medicine, Tennessee Medical Association, Editorial Advisory Board, *The Spine Journal*

*Guidelines Related Professional Activities*—Chair, Spine Panel, *Occupational Medicine Practice Guidelines*; (update to 2nd Edition); Associate Editor, *APG Insights*, ACOEM; Associate Editor, *AMA Guides Newsletter*; Section Editor, *Medical Disability Advisor*, 3rd, 4th, 5th Editions; Chair, Medical Advisory Board, 6th Edition; Reviewer, *Guides to the Evaluation of Permanent Impairment*, 5th Ed., Chapter author, 6th Edition; President Elect, American Academy of Disability Evaluating Physicians

*Research Grants/Other Support*—Federal Motor Carrier Safety Administration, physicians work group

*Financial/Non-Financial Conflict of Interest*—None

Gunnar B. J. Andersson, MD, PhD

Adjunct Professor, University of Illinois at Chicago; Partner, Midwest Orthopaedics at Rush

*National, Regional, Local Committee Affiliations*—Council on Research, American Academy of Orthopaedic Surgeons (2000-2008); Accredited Standards Committee, National Safety Council (1990-2000); Advocacy Committee, Orthopaedic Research Society (2000-2009); NIAMS (NIH) Advisory Council Member (2002–2004); Scientific Leadership Committee, Rush University Medical Center (2008-present); Social Security Administration: Occupational Information Development Advisory Panel (2009-2011); Medical Review Board, Federal Motor Carrier Safety Administration (2006–2010)

*Guidelines Related Professional Activities*—Member, Spine Advisory Board for Orthopedics for United Healthcare; Creation Panel, American Academy of Orthopaedic Surgeons; Panel, Spinal Arthroplasty Society

*Research Grants/Other Support*—NIH (Grant # 5 P01 AR048152-10)

*Financial/Non-Financial Conflict of Interest*—Currently, involved in development of treatment guidelines for United Healthcare and Spinal Arthroplasty Society; The Ronald L. DeWald, MD, Professor and Chairman Emeritus, Department of Orthopedic Surgery, Rush University Medical Center

Eugene Carragee, MD

Professor and Vice Chairman, Stanford University School of Medicine; Director, Stanford University Medical Center and Clinics; Editor in Chief, The Spine Journal; Active Medical Staff, Lucille Salter Packard Children's Hospital

*National, Regional, Local Committee Affiliations*—Scientific Secretariat Member, Institute for Work and Health

*Guidelines Related Professional Activities*—Low Back Pain Guidelines Panel, American College of Physicians

*Physicians Research Grants/Other Support*—None

*Financial/Non-Financial Conflict of Interest*—Completing Low Back Pain Guidelines for American Pain Society of American College of Physicians

Ronald Donelson, MD, MS

President, SelfCare First, LLC

*National, Regional, Local Committee Affiliations*—Co-Chair, Exercise Committee, North American Spine Society (2007-present); Member,

Committee on Rehabilitation, Interventional and Medical Spine Care, North American Spine Society (2008-present); Vice President, American Back Society

*Guidelines Related Professional Activities*—Member, Clinical Guidelines Advisory Panel, North American Spine Society (2002-2008); Associate Member, Joint Clinical Guide of Practice For First Line Low Back Pain, Province of Quebec (2002-2006); Reviewer, Cochrane Back Review Group project (2007)

*Research Grants/Other Support*—None

*Financial/Non-Financial Conflict of Interest*—Consultant: The McKenzie Institute International

Marjorie Eskay-Auerbach, MD, JD

President/CEO, SpineCare and Forensic Medicine, PLLC; Consultant and Author, American Medical Association

*National, Regional, Local Committee Affiliations*—Chairperson, Ethics Committee, North American Spine Society

*Guidelines Related Professional Activities*—Contributing Editor, AMA Guides 6th Edition (no remuneration); Reviewer for ODG Guidelines (no remuneration)

*Research Grants/Other Support*—None

*Financial/Non-Financial Conflict of Interest*—Until 3/31/10: reviewed literature for medical devices for DePuy Spine; Consultant, Stryker Spine

Jill Galper, PT, MEd

Vice President, Clinical Program Development, IMX Medical Management Services

*National, Regional, Local Committee Affiliations*—Executive Committee, Southeast District, Pennsylvania Physical Therapy Association

*Guidelines Related Professional Activities*—Affiliate Editor, ACOEM's *APG Insights*; American Physical Therapy Association (APTA) Representative for *Occupational Medicine Practice Guidelines*, 2nd Edition (2004)

*Research Grants/Other Support*—None

*Financial/Non-Financial Conflict of Interest*—None

Elizabeth Genovese, MD, MBA, FACOEM

Medical Director, IMX Medical Management Services; Adjunct Assistant Professor of Medicine, Associated Faculty, University of Pennsylvania School of Medicine

*National, Regional, Local Committee Affiliations*—Board of Directors, American Academy of Disability Evaluating Physicians; Advisory Committee, Athena Institute for Women's Wellness; Board of Directors, Philadelphia OEMS; Committee on Coding and Classification, ACOEM; Committee on Return to Work, ACOEM; Evidence-based Practice Committee, ACOEM; AMA CPT Advisory Committee, ACOEM Representative; Director, "Musculoskeletal Diagnosis and Treatment" course, ACOEM; Co-Director, "Clinical Guidelines" course, ACOEM

*Guidelines Related Professional Activities*—Member, Evidence Based Practice Committee, *Occupational Medicine Practice Guidelines*, 2nd Edition, 2004; Editor, ACOEM's *APG Insights*; Section Reviewer, *AMA Guides to the Evaluation of Permanent Impairment*, 6th Edition

*Research Grants/Other Support*—None

*Financial/Non-Financial Conflict of Interest*—Consultations: Client companies are often interested in guidelines

Michael Goertz, MD, MPH

Program Director for Medical Spine, Health Partners Medical Group

*National, Regional, Local Committee Affiliations*—Medical Services Review Board, DOL State of Minnesota; Member, Impairment without Disability Conference Committee

*Guidelines Related Professional Activities*—Panel Member for Disability Prevention/Management, Low Back, and Cervical and Thoracic

Spine, ACOEM *Practice Guidelines*; Member, Evidence Based Practice Committee, ACOEM *Practice Guidelines*, 2nd Edition, 2004; Co-chair, ICSI Low Back group

*Research Grants/Other Support*—None

*Financial/Non-Financial Conflict of Interest*—None

Scott Haldeman, MD, DC, PhD, FRCP(C), FAAN, FCCS

Clinical Professor, Department of Neurology, UCI; Adjunct Professor, Department of Epidemiology, UCLA School of Public Health

*National, Regional, Local Committee Affiliations*—Past President and Committee Member, North American Spine Society; Past President and committee member, American Back Society; Chairman, World Federation of Chiropractic Research Council

*Guidelines Related Professional Activities*—Member, IASP Neuropathic Pain Special Interest Group; Member, State of California Department of Workers' Compensation Medical Evidence Evaluation Advisory Committee; Panel Member, U.S. Department of Health and Human Services, Agency for Health Care Policy and Research's Clinical Practice Guidelines on "Acute Low Back Pain in Adults"; Commission Chairman, Guidelines for Chiropractic Quality Assurance and Practice Parameters; Facilitator, American Academy of Neurology's Assessment: The Neurological Evaluation of Male Sexual Dysfunction, Report of the Therapeutics and Technology Assessment Subcommittee; Practice Guidelines Committee and Guidelines Committee Advisory Panel, North American Spine Society; President, The Bone and Joint Decade 2000-2010 Task Force on Neck Pain and Its Associated Disorders; Associate Editor, Spine; Associate Editor and past Deputy Editor, *The Spine Journal*; Editorial Board, Journal *of Manipulative and Physiological Therapeutics*; Editorial Board, *Alternative Therapies*; Editorial Board, Australian Chiropractic Association; Editorial Board, *Journal of the Canadian Chiropractic Association*; Editorial Board, *The Back Letter*; International Advisory Board, *Clinical Chiropractic*

*Research Grants/Other Support*—None at present; grants to the Task Force on Neck Pain and Its Associated Disorders in 2000-2007.

*Financial/Non-Financial Conflict of Interest*—Financial: private practice, consultant Palladian Health, royalties from published textbooks/Non-financial: multiple positions in organizations and associations

Paul D. Hooper, DC, MPH, MS

Visiting Assistant Professor, University of Bridgeport, College of Chiropractic; Adjunct Professor, University of Bridgeport, Fones School of Dental Hygiene; Adjunct Professor, University of Bridgeport, Department of Mechanical Engineering; Professor Emeritus, Southern California University of Health Sciences; President, WorkAbility Management Group

*National, Regional, Local Committee Affiliations*—Member, California Utilization Review Committee (2004); Member, Medical Advisory Board (1997-present)

*Guidelines Related Professional Activities*—Consultant to Panel, Low Back, ACOEM; Medical Disability Advisor, Reed Group

*Research Grants/Other Support*—None

*Financial/Non-Financial Conflict of Interest*—None

Donald R. Murphy, DC, DACAN

Clinical Director, Rhode Island Spine Center; Clinical Assistant Professor, Alpert Medical School of Brown University

*National, Regional, Local Committee Affiliations*—Board of Chiropractic Examiners, State of Rhode Island (2005-present); International Scientific Advisory Board, Expert Clinical Benchmarks (2008-present); Chairman, Committee on Research and Publications, The West Hartford Group (2005-present)

*Guidelines Related Professional Activities*—Member, Low Back Pain Guideline, American Pain Society; Head of Cervical Spine Section, The Council on Chiropractic Guidelines and Practice Parameters; Principle writer, Guideline for the Management of Whiplash Injuries, Canadian Chiropractic Association

*Research Grants/Other Support*—None

*Financial/Non-Financial Conflict of Interest*—None

William G. Tellin, DC, DABCO

Private Practice, Doctor of Chiropractic

*National, Regional, Local Committee Affiliations*—Annual Clinical Conference Chair, American College of Chiropractic Consultants

*Guidelines Related Professional Activities*—Panel Consultant, Low Back Pain Clinical Practice Guidelines 2007 revision, ACOEM; Panel Consultant, Chronic Pain Clinical Practice Guideline 2008, ACOEM

*Research Grants/Other Support*—None

*Financial/Non-Financial Conflict of Interest*—None

Russell Travis, MD

Associate Medical Director, Cardinal Hill Rehabilitation Hospital; Voluntary Faculty, University of Kentucky Physical Medicine and Rehabilitation Department

*National, Regional, Local Committee Affiliations*—Past President, American Association of Neurological Surgeons; Past President, The Neurological Society of America; Member, Kentucky Medical Licensure

*Board Guidelines Related Professional Activities*—Chapter Work Group, AMA Guides to the Evaluation of Permanent Impairment, 6th Edition; Editorial Advisory Board, *Official Disability Guidelines*, ODG Treatment; Advisory Board, ACOEM's *APG Insights*

*Research Grants/Other Support*—None

*Financial/Non-Financial Conflict of Interest*—None

Michael S. Weiss, MD, MPH, FACOEM, FAAPMR, FAANEM

Health Education Volunteer, Peace Corps, Albania, Group 12; Assistant Clinical Professor, Department of Rehabilitation Medicine/Department of Environmental and Occupational Medicine, University of Washington School of Medicine

*National, Regional, Local Committee Affiliations*—Corporate Health Achievement Award reviewer, ACOEM; Board, Northwest Occupational and Environmental Medical Association; Resident Advisory Committee, University of Washington, Department of Environmental and Occupational Medicine

*Guidelines Related Professional Activities*—None

*Research Grants/Other Support*—None

*Financial/Non-Financial Conflict of Interest*—None

## Guideline Status

This is the current release of the guideline.

## Guideline Availability

Electronic copies: To order a subscription to APG-I, the online version of the Guidelines, call 847-818-1800 or visit http://www.acoem.org/apg-i.aspx.

Print copies are available from the American College of Occupational and Environmental Medicine (ACOEM), 25 Northwest Point Boulevard, Suite 700, Elk Grove Village, IL 60007 by calling 847-818-1800 or order online at http://www.acoem.org/PracticeGuidelines.aspx.

Subscriptions to ACOEM's Practice Guidelines App are available for iPhone/iPod and iPad interfaces from the iTunes Web site.

## Availability of Companion Documents

The following is available:

- Methodology for the update of the occupational medicine practice guidelines, 2nd edition. Elk Grove Village (IL): American College of Occupational and Environmental Medicine (ACOEM); 2008. Available from the ACOEM Web site .

## Patient Resources

None available

## NGC Status

This NGC summary was completed by ECRI Institute on July 20, 2012. The information was verified by the guideline developer on August 6, 2012. This summary was updated by ECRI Institute on October 28, 2013 following the U.S. Food and Drug Administration advisory on Acetaminophen. This summary was updated by ECRI Institute on July 3, 2014 following the U.S. Food and Drug Administration advisory on Epidural Corticosteroid Injection. This summary was updated by ECRI Institute on September 18, 2015 following the U.S. Food and Drug Administration advisory on non-aspirin nonsteroidal anti-inflammatory drugs (NSAIDs). This summary was updated by ECRI Institute on June 2, 2016 following the U.S. Food and Drug Administration advisory on Opioid pain medicines.

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